Combined Gas Law

Standard Temp and Pressure (STP): 0 ºC, 101.3 kPa

Standard Ambient Temp and Pressure (SATP): 25 ºC, 100 kPa

The previous gas laws we learned all have special conditions which do not make them always useful. Combining them reduces the restrictions on what we can calculate

Boyle's:

Charles':

Gay-Lussac's:

Since pressure and temperature are directly related to volume and are inversely related to each other:

This allows us to change 3 variables at the same time.

Ex 1. In the morning, Judy puts 2.5 L balloons on her mailbox as part of her son's birthday party. A high pressure system moves in (104.9 kPa) making the day sunny and 32 ºC. If the morning air temp was 15 ºC, and pressure was 101.3 kPa, what will the volume of the balloons be?

Dalton's Law of Partial Pressures

The total pressure of a mixture of gases is the sum of the pressures of each of the individual gases.

$P_{Total} = P_1 + P_2 + P_3$ .....

Ex 2. If 3 atm of CO_2 gas is added to 2 atm of Cl_2, what is the total pressure in the container?

Ex 3. Air contains 78 % Nitrogen gas at STP. Calculate the partial pressure.